

Patent Claims

1. A cooling circuit of an internal combustion engine
5 of motor vehicles having a main cooling circuit,
composed of a section (3) located upstream of the
radiator, a main radiator (5a), a radiator return flow
section (8), a coolant pump (10), a main thermostat (2)
10 and a bypass or short circuit (4) between the main
thermostat (2) and coolant pump (10), and having a low-
temperature circuit, composed of a low-temperature
radiator (5b), a low-temperature radiator return flow
section (11), a valve unit and an additional heat
15 exchanger, wherein the low-temperature radiator (5b) is
connected in parallel with the main radiator (5a).

2. The cooling circuit as claimed in claim 1, wherein
the main thermostat (2) is arranged in the section (3)
located upstream of the radiator.
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3. The cooling circuit as claimed in claim 1, wherein
the main thermostat (2) is arranged in the radiator
return from section (8).

25 4. The cooling circuit as claimed in claim 1, 2 or 3,
wherein the additional heat exchanger is embodied as a
gear oil radiator (13).

5. The cooling circuit as claimed in claim 2, wherein
30 the valve unit is embodied as a mixing thermostat (14)
with two inlets and one outlet, wherein the first inlet
and the outlet are connected into the return flow
section (11) of the low-temperature radiator (5b), and
the second inlet is connected to the main thermostat
35 (2).

6. The cooling circuit as claimed in claim 5, wherein
a warming up thermostat (16) is connected between the

second inlet and the main thermostat (2).

7. The cooling circuit as claimed in claim 2, wherein the valve unit is embodied as a warming up thermostat
5 (16) which is connected between the return flow section (11) of the low-temperature radiator (5b) and the bypass (4).

8. The cooling circuit as claimed in claim 3, wherein
10 the valve unit is embodied as a mixing thermostat (4) with two inlets and one outlet, wherein the first inlet and the outlet are connected into the return flow section (11) of the low-temperature radiator (5b), and the second input is connected to the section (3)
15 located upstream of the radiator.

9. The cooling circuit as claimed in claim 8, wherein a warming up thermostat (16) is connected between the section (3) located upstream of the radiator and the
20 second inlet.

10. The cooling circuit as claimed in claim 3, wherein the valve unit is embodied as a warming up thermostat (16) which is connected into the return flow section
25 (11) of the low-temperature radiator (5b).

11. A coolant radiator of a cooling circuit of an internal combustion engine of a motor vehicle, composed of a pipe/rib block, a coolant inlet box (51, 62) with
30 a coolant inlet (53, 63), a collecting box (52, 64) which have a coolant connection to the pipe/rib block, in which case the pipe/rib block has in a main region (50a, 61a) and a low-temperature region (50b, 61b), and with coolant outlets for a coolant main flow and a
35 coolant partial flow, wherein the main region (50a, 61b) and the low-temperature region (50b, 61b) are connected in parallel.

12. The coolant radiator as claimed in claim 11, wherein a separating element (54, 66) which divides the pipe/rib block into the main region (50a, 61a) and the low-temperature region (50b, 61b), and divides the
5 collecting box (52, 64) into a main chamber (55, 67) and secondary chamber (56, 68) is arranged in the collecting box (52, 64).

13. The coolant radiator as claimed in claim 12,
10 wherein the dividing element is embodied as a sealed dividing wall (54, 66).

14. The coolant radiator as claimed in claim 12, wherein the dividing element is embodied as an unsealed
15 dividing wall with a throttle point.

15. The coolant radiator as claimed in claim 12, wherein the dividing element is embodied as a dividing wall with a valve.
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16. The coolant radiator as claimed in one of claims 11 to 15, wherein a partial stream of coolant, which makes up approximately 4% to 15% of the entire stream of coolant, can flow through the low-temperature
25 region (50b, 61b).

17. The coolant radiator as claimed in one of claims 12 to 16, wherein an additional heat exchanger, in particular a gear oil radiator (59, 72) is
30 integrated into, or with, the collecting box (52, 64), and a partial stream of coolant can flow through it.

18. The coolant radiator as claimed in claims 12 and 17, wherein an open longitudinal dividing wall (57) is
35 arranged in the main chamber (55) and forms a mixing chamber (58) in which the additional heat exchanger (59) is arranged.

19. The coolant radiator as claimed in claim 18, wherein a mixing thermostat (60), which has a coolant connection to the secondary chamber (56) and the mixing chamber (58) and can be connected to the cooling circuit, is integrated into the mixing chamber (58).

20. The coolant radiator as claimed in claim 17, wherein the additional heat exchanger (72) is attached to the collecting box (64) by means of a mounting plate (71).

21. The coolant radiator as claimed in claim 20, wherein a mixing chamber (69) is arranged in the region of the secondary chamber (68) and a mixing thermostat (70) which has a coolant connection to the secondary chamber (68) and to the mixing chamber (69) and can be connected to the cooling circuit is integrated into the mixing chamber (69), and wherein the additional heat exchanger (72) has a coolant connection to the mixing chamber (69) and the main chamber (67).